CLMPTO

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AC

1. Implant comprising or consisting of titanium and having one or more surfaces which can be applied in or on tissue areas and/or bone growth areas, one or more of the said surfaces being arranged with a depot for bone-growth-initiating or bone-growth-stimulating substance, which depot is formed by a pore arrangement in a relatively thick oxide layer on the titanium, characterized in that the substance, for a period of time, is acted on by, or works with, one or more release functions which permit a preferably essentially controlled release of substance to the respective surrounding tissue or tissue/bone growth areas.

2. Implant according to Patent Claim 1, characterized in that two or more release arrangements are obtained by means of different pore arrangements within one or more areas of one or more of the said surfaces.

3. (Amended) Implant according to Patent Claim 1, characterized in that pores with different pore characteristics, for example open or more or less closed pores, pore depth, pore density, pore volume, etc., are arranged within one or more areas.

4. (Amended) Implant according to Patent Claim 1, characterized in that the release function(s) operate(s) with combinations of larger and smaller pores arranged to effect a desired release sequence over time.

5. Implant according to Patent Claim 4, characterized in that larger pores effect a more rapid release, and smaller and/or deep pores effect a delayed release.

6. (Amended) Implant according to Claim 1, characterized in that different areas are provided with different pore characteristics.

7. (Amended) Implant according to Claim 1, characterized in that the surface of the oxide layer comprises about 20% titanium, about 55% oxygen and about 20% carbon, and the layer otherwise consists of titanium dioxide.

8. (Amended) Implant according to Claim 1, characterized in that the oxide layer has a surface roughness of about 1 - 5 μm or less.

9. (Amended) Implant according to Claim 1, characterized in that the oxide layer has a thickness in the range of 1 - 20 μm, preferably 2 - 20 μm.

10. (Amended) Implant according to Claim 1, characterized in that the oxide layer is highly porous, with pore diameters in the range of 0.01-10 μm.

11. Implant for application in a hole formed in tissue and/or bone, for example the jaw bone, characterized in that it comprises a titanium portion which can cooperate with the hole formation, in that the titanium portion is designed with one or more very thick titanium oxide layers having surfaces which can be placed against the tissue and/or bone in the hole formation, in that each oxide layer is provided with a pore arrangement which functions as a depot for bone-growth-initiating and/or bone-growth-stimulating substance, for example a substance belonging to the superfamily TGP-β, and in that, when the depot is filled with substance and the implant is in position in the hole, a release function for releasing the substance to the bone comes into operation.

12. Implant according to Patent Claim 11, characterized in that the release function is controlled, for a chosen period of time.

13. Implant according to Patent Claim 12, characterized in that the release function is controlled by the choice of pore arrangement and pore characteristics in or on the said layer.

14. (Amended) Implant according to Claim 11, characterized in that the oxide layer is highly porous.

15. (Amended) Implant according to Claim 11, characterized in that it is a screw implant which bears the said oxide layers and surfaces on its threads.

16. Method for producing an implant intended to be applied in or at a hole formed in tissue and/or bone, preferably the jaw bone, characterized in that the implant is produced, for example by means of machining, with a portion of titanium which has surfaces which can be placed against the bone and/or tissue when the implant is in position in the hole, in that the said titanium on the said surface or surfaces is subjected to anodic oxidation to an extent which gives a highly porous and relatively thick oxide layer on each surface concerned, in that bone-growth-initiating substance or bone-growth-stimulating substance, for example a substance belonging to the superfamily TGF-β, is applied to the said porous and thick layers, for example by saturation or immersion, and in that the implant is placed in its position in the hole, resulting in the process of release of the substance to the bone being started by the release of components in the tissue and/or bone.

17. Method according to Patent Claim 16, characterized in that the implant, at the part or parts bearing the said surfaces, is provided with one or more threads, and in that the implant is screwed into the bone.

18. (Amended) Method according to Patent Claim 16, characterized in that the oxide layer is immersed in a container holding the substance.

19. Use of a highly porous and thick titanium oxide layer to which bone-growth-initiating and bone-growth-stimulating substance has been added, for example a substance belonging to the superfamily TGF-β, characterized in that it is used on implants which can be inserted into holes in tissue and/or bone, preferably the jaw bone.

20. Use according to Patent Claim 19, characterized in that it is used on the thread or threads of the implant and/or on the area above the thread or threads.

21. (Amended) Use according to Patent Claim 19, characterized in that it is used in holes involving soft and/or reduced bone.

22. Implant comprising or consisting of titanium and having one or more surfaces which can be applied in or on tissue areas and/or bone growth areas, one or more of the said surfaces being arranged with a depot for bone-growth-initiating or bone-growth-stimulating substance, for example a substance belonging to the superfamily TGF-β, which depot is formed by a pore arrangement in a relatively thick oxide layer on the titanium, characterized in that the oxide layer has a thickness in the range of 1 - 20 µm, for example 2 - 20 µm.

23. Implant according to Patent Claim 22, characterized in that the oxide layer has a surface roughness in a range of 0.4 - 5 µm.

24. (Amended) Implant according to Patent Claim 22, characterized in that the oxide layer is highly porous, with 1×10^9 - 1×10^{10} pores/cm^2.

25. (Amended) Implant according to Patent Claim 22, characterized in that each surface essentially has pores with diameter sizes in the range of 0.1 - 10 µm, and/or in that the total pore volume is within a range of 5×10^{-2} and 10^{-5} cm^3.

26. Method for producing, on an implant comprising or consisting of titanium, and by means of anodic oxidation, relatively thick oxide layers on one or more titanium surfaces which are intended to be placed against or arranged adjacent to one or more tissue and/or bone growth areas, in which method at least the part or parts bearing the said surface or surfaces are prepared and immersed in electrolyte and the implant is brought into contact with an electrical energy source above the electrolyte surface, and the oxidation process is established by also connecting to the energy source a counter-electrode which is arranged in the electrolyte, characterized in that diluted inorganic acids, diluted organic acids and/or small quantities of hydrofluoric acid or hydrogen peroxide are added to the electrolytic composition, and in that the energy source is chosen to operate at a voltage value or voltage values in the range of 150 - 400 volts.

27. Method according to Patent Claim 26, characterized in that the voltage is varied for the same implant at different times in order to create different pore sizes within the same surface areas.

28. (Amended) Method according to Patent Claim 26, characterized in that the position of the implant in the electrolyte is changed, together with the composition of the electrolyte and/or the voltage, in order to create different oxide thicknesses and/or areas with different porosity or pore characteristics.